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09/588,549	06/07/2000	Ichiro Okumura	35.C14536	9162

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EXAMINER
KAO, CHIH CHENG G

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 06/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/588,549	Applicant(s) OKUMURA ET AL.	
	Examiner Chih-Cheng Glen Kao	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,13-15,30,33 and 35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,13-15,30,33 and 35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 February 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-5, 13-15, 30, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Igaki et al. (JP 11-23324) in view of Igaki (US Patent 5,124,548) and Heitmann et al (US Patent 3856401).

2. Regarding claim 1 and 30, Igaki et al. discloses an optical encoder for detecting an angle, speed, or position of relative rotation or translation comprising (Abstract): a light irradiating system, an optical scale having grating for transmitting or reflecting incident light, light receiving elements disposed in a plurality of different directions (Drawing 14), and an optical system constructed to amplitude-modulate light by the transmitting or reflecting grating, by a dividing element in which a plurality of V-grooves are juxtaposed (Drawing 13) to divide the light along a plurality of different directions having different phases to the light-receiving elements, wherein the dividing element is comprised of repetitions of such a structure that V-grooves consisting of planes of mutually different angles are juxtaposed at a predetermined pitch (Detailed description, [0012]), and wherein the dividing element and optical scale are comprised of a common member in an outside region or inside region of the grating (Drawing 13 and 14).

However, Igaki et al. does not specifically disclose a driving system comprising: a driver system, a control system, and the optical encoder, different angles, nor forming four beams.

Igaki teaches a driving system comprising: a driver system, a control system and the optical encoder (Fig. 14). Igaki also teaches different angles (col. 4, lines 46-52). Heitmann et al. teaches four beams (Fig. 2 and 2a).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the driving system of Igaki with the device of Igaki et al., since one would be motivated to have some form of an automated driving system to rotate the optical scale and operate as a feedback system as shown by Igaki (col. 6, lines 33-53).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate different angles of Igaki with the device of Igaki et al., since making angles different is considered an obvious variation in the art as implied from Igaki (col. 4, lines 46-52) One would be motivated to have different angles to cause the light beam to easily be separated into two directions to be incident on separate light receiving devices (col. 4, lines 46-52) as implied from Igaki.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the four beams of Heitmann et al. with the device of Igaki et al., since one would be motivated to incorporate this to have a measurement in the grating plane in two directions, which are not parallel to each other (col. 4, lines 36-40) as implied from Heitmann et al.

3. With regards to claim 2, Igaki et al. in view of Igaki and Heitmann et al. suggest a device as recited above.

However, Igaki et al. does not specifically disclose four beams forming two sets of beams having a phase relation of 180^0.

Heitmann et al. further teaches four beams forming two sets of beams having a phase relation of 180^0 (col. 3, lines 60-67, and col. 4, lines 37-45).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the two sets having a phase relation of 180^0 of Heitmann et al. with the suggested device of Igaki et al. in view of Igaki and Heitmann et al., since one would be motivated to incorporate this to have a measurement in the grating plane in two directions, which are not parallel to each other (col. 4, lines 36-40) as implied from Heitmann et al.

4. With regards to claim 3, Igaki et al. in view of Igaki and Heitmann et al. suggest a device as recited above.

However, Igaki et al. does not specifically disclose four types of different planes.

Heitmann et al. further teaches four types of different planes (Fig. 2a, pyramid sides of #27).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the four types of different planes of Heitmann et al. with the suggested device of Igaki et al. in view of Igaki and Heitmann et al., since one would be motivated to incorporate this to have a measurement in the grating plane in two directions, which are not parallel to each other (col 4, lines 36-40) as implied from Heitmann et al.

5. With regards to claim 4, Igaki et al. further discloses the dividing element and optical scale of a common member (Drawing 8).

6. With regards to claim 5, Igaki et al. further discloses the dividing element of a common member provided in an outside or inside region of the grating.

7. Regarding claims 13 and 33, Igaki et al. discloses an optical encoder for detecting an angle, speed, or position of relative rotation or translation comprising (Abstract): a light irradiating system, an optical scale having grating for transmitting or reflecting incident light, light receiving elements disposed in a plurality of different directions (Drawing 13), wherein light travels to the scale slits of a first region to a condensing mirror or optical element to a second region of scale slits (Drawing 13) with V-shaped grooves to form beams of different phases (Drawing 8, #3a and 3b).

However, Igaki et al. (JP) does not specifically disclose the slope angles different and a driving system comprising: a driver system, a control system, and the optical encoder.

Igaki teaches a driving system comprising: a driver system, a control system and the optical encoder (Fig. 14). Igaki also teaches slope different angles (col 4, lines 46-52). Heitmann et al. teaches four beams (Fig. 2 and 2a).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the driving system of Igaki with the device of Igaki et al.,

since one would be motivated to have some form of an automated driving system to rotate the optical scale and operate as a feedback system as shown by Igaki (col. 6, lines 33-53).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate different angles of Igaki with the device of Igaki et al., since making angles different is considered an obvious variation in the art as implied from Igaki (col. 4, lines 46-52). One would be motivated to have different angles to cause the light beam to easily be separated into two directions to be incident on separate light receiving devices (col. 4, lines 46-52) as implied from Igaki.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the four beams of Heitmann et al. with the device of Igaki et al., since one would be motivated to incorporate this to have a measurement in the grating plane in two directions, which are not parallel to each other (col. 4, lines 36-40) as implied from Heitmann et al.

8. Regarding claim 14, Igaki et al. in view of Igaki and Heitmann et al. suggest a device as recited above.

However, Igaki et al. (JP) does not specifically disclose the slope angles of the V-shaped grooves in the first region smaller than those in the second region.

Igaki further teaches slope different angles (col. 4, lines 46-52).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate different angles of Igaki for slope angles in the first region smaller than those in the second region with the device of Igaki et al., since making angles

different is considered an obvious variation in the art as implied from Igaki (col. 4, lines 46-52). One would be motivated to have different angles to cause the light beam to easily be separated into two directions to be incident on separate light receiving devices (col. 4, lines 46-52) as implied from Igaki.

9. Regarding claim 15, Igaki et al. further discloses the optical encoder for detecting an angle, speed, or position of relative rotation or translation comprising (Abstract).

10. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Igaki et al. (JP 11-23324) in view of Igaki (US Patent 5,124,548) and Ishizuka (US Patent 5498870).

Igaki et al. (JP) discloses an optical encoder for detecting an angle, speed, or position of relative rotation or translation comprising (Abstract): a light irradiating system, an optical scale having grating for transmitting or reflecting incident light, light receiving elements disposed in a plurality of different directions (Drawing 14), wherein light travels to the scale slits of a first region to a condensing mirror to a second region of scale slits so that light passed via the scale slits of the second region is guided to the light-receiving element (Drawing 14).

However, Igaki et al. (JP) does not specifically disclose a driving system comprising: a driver system, a control system, and the optical encoder, nor the scale reflecting.

Igaki teaches a driving system comprising: a driver system, a control system and the optical encoder (Fig. 14). Ishizuka teaches the scale reflecting (Fig. 1, "G")

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the driving system of Igaki with the device of Igaki et al.

(JP), since one would be motivated to have some form of an automated driving system to rotate the optical scale and operate as a feedback system as shown by Igaki (col. 6, lines 33-53).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the reflecting scale of Ishizuka with the device of Igaki et al. (JP), since one would be motivated to have this arrangement to have a compact structure (col. 1, lines 64-67) as implied from Ishizuka et al. (Abstract).

Response to Arguments

11 Applicant's arguments with respect to claims 1-5, 13-15, 30, 33, and 35 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Glen Kao whose telephone number is (703) 605-5298. The examiner can normally be reached on M - Th (8 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

gk
June 11, 2003

DAVID V. BRUCE
PRIMARY EXAMINER